California High-Speed Train Project

CALIFORNIA
High-Speed Rail Authority

TECHNICAL MEMORANDUM

Alternatives Analysis Methods For Project EIR/EIS

Version 3

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0	22 Jun. 09	Initial Release
1	15 Aug. 09	PMT Revisions
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TABLE OF CONTENTS

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1.0 PURPOSE

1.1 Introduction

This memorandum is Version 3 of the California High-Speed Train (HST) Project Alternative Analysis (AA) Methods. The revisions to these methods are intended to expand the role of the California High-Speed Rail Authority Board in the AA process and provide additional opportunities for environmental review agencies, local agencies, stakeholders, and the public to provide input and comments.

The AA process is for the identification of feasible and practicable alternatives to carry forward for environmental review and evaluation in Environmental Impact Reports/Environmental Impact Statements (EIR/EIS) for sections of the California HST Project (CHSTP). In developing the AA the regional teams will begin analysis with the alternatives selected with the previously prepared statewide and Bay Area program EIRs/EISs. After identifying initial project alternatives; alignment plans, profiles, and sections will be developed and used for the preliminary evaluation of the alternatives. The AA evaluations will be used to assist the California High-Speed Rail Authority (Authority) and the Federal Railroad Administration (FRA) in identifying the range of potentially feasible alternatives to analyze in the draft project EIR/EIS. The guidelines contained in this memorandum are designed to maintain consistency among the regional teams in identifying an appropriate range of alternatives to analyze in each EIR/EIS, conducting a preliminary analysis, applying evaluation measures, and documenting the evaluation process, while still allowing flexibility to account for consideration of regional differences.

1.2 Applicability

The AA is intended to provide the Authority and the FRA with sufficient information and documentation to provide a clear understanding of the evaluation process used to identify and define a range of reasonable, practicable, and feasible project alternatives. The alternatives evaluation will support decisions guiding the project design and environmental review process, including specifically the identification of reasonable alternatives to be further considered in the project environmental analysis and the identification of alternatives that will not be studied in the EIR/EIS analysis. The Authority and the FRA will make these decisions considering agency and public input. The results of the AA will be presented in a Preliminary AA Report providing the basis for drafting the Alternatives chapter in the Draft Project EIR/EIS. Changes to the alternatives being considered will be presented in subsequent Supplemental AA Reports.

1.3 OVERVIEW

Whereas the program EIR/EISs analyzed alternative corridors and station location alternatives, site-specific alignment and station alternatives will be developed for the project AA. In the statewide program EIR/EIS, No Project, Modal, and HST Alternatives were considered. The Authority and FRA selected the HST Alternative and selected corridor alternatives and station location options for further analysis, and identified needs for HST system cleaning and maintenance facilities. The Bay Area to Central Valley HST Program EIR/EIS supported Authority and FRA selection of corridor alternatives and station location options for further analysis in the Bay Area and Central Valley regions. The program-level environmental reviews were integrated with early steps in the Clean Water Act Section 404 alternatives analysis process.

The evaluation conducted for each of the AAs will be based on a level of detail that considers preliminary project features at a 2% to 4% level of engineering design. The analysis of alternatives will take into account previous work conducted for the Program EIRs/EISs. In some locations, program-level decisions narrowly defined the HST corridor, while in other locations a broader area was defined as the corridor for further evaluation. In addition, each of the regional teams will consider public and agency comments in response to the project EIR/EIS scoping processes and direction from the Authority and FRA. Input received during the agency involvement process will also be considered a key part of the alternatives analysis process to identify reasonable and feasible alternatives to carry forward for environmental review. The Preliminary AA Report will document how each of the alternatives meets the Purpose and Need for the project, and how evaluation measures were used to determine which alternatives would be

carried forward for environmental analysis and which alternatives did not meet the evaluation measures and would not be carried forward for further analysis. An outline of the Preliminary AA Report is attached as Appendix A.

1. 4 Additional Information

Additional information and resources on HST system background, technical guidance, and evaluation measures as well as previous Authority and FRA decisions can be found in the following locations.

http://www.cahighspeedrail.ca.gov/

Final Program EIR/EIS, Volumes 1 through 3, August 2005; the Authority's Certification and Decision on the Final Program EIR/EIS (Resolution No. 05-01); FRA Record of Decision for California High-Speed Train System, November 18, 2005, including the Mitigation Monitoring and Reporting Plan, the Summary of Public Comments from CEQA Certification, and the Errata for the Final Program EIR/EIS.

Final Bay Area to Central Valley High-Speed Train Program EIR/EIS, Volumes 1 through 3, May 2008, including the Mitigation Monitoring and Reporting Plan, the Summary of Public Comments from CEQA Certification, and the Errata for the Final EIR/EIS; the Authority's Certification and Decision on the Final Program EIR/EIS (Resolution No. 08-01); and FRA Record of Decision, December 2, 2008.

https://ww2.projectsolve2.com/eRoom/SFOF/CAHSRProgramMgmt

2.0 LEVEL OF EFFORT

2.1 APPROACH

The AA will document the initial process of defining and evaluating project alternatives for sections of the HST system. The process will begin with the alignment and station information provided in the relevant program EIR/EIS, which with additional information gathered by the section design team and information collected during scoping, will be used by the team to identify preliminary project alternatives. These alternatives will include alignment alternatives, station site alternatives, alternative sites for maintenance and storage facilities, and power supply facility alternatives needed for the HST system section. As the AA process continues, the alternatives will be revised using CHSTP design criteria for trackwork geometries, civil and structures design, systems design, and train operations.

The Preliminary AA Report will provide sufficient detail to document the evaluation process used to identify reasonable and feasible project alternatives that would meet the Purpose and Need for the project and are consistent with the Basis of Design Report, identify those alternatives where environmental issues (severe conflicts or constraints) or engineering challenges may justify dropping them from further analysis, and provide comparative information and data that highlight and compare similarities and differences between alternatives by using project design criteria. Each Regional Team will evaluate preliminary location and design alternatives against existing conditions, project-related changes, applicable state and federal standards, environmental impact criteria, design criteria, construction and operating factors, to support identification and selection of the reasonable range of practicable and feasible alternatives for project environmental review.

The process will include the following steps:

Step 1: Initial Development of Alternatives for an HST Project EIR/EIS
The alternative alignments and station location sites considered at this initial stage of the AA process include: (1) alternatives selected in the Statewide Program Level EIR/EIS; (2) alternatives suggested by the agencies, stakeholders, and public during the environmental scoping process; and (3) alternatives suggested by the Regional Consultants that meet project objectives and avoid or reduce significant environmental impacts.

Step 2: USEPA/Corps Staff Briefing
The initial alternatives to be considered for further study and those potentially not to be considered further, are discussed with the USEPA and Corps as part of the 404 NEPA Integration process for their comment and feedback.

Step 3: Board Briefing of Initial Alternatives
The initial alternative alignments, station locations, and design options considered and recommended to be carried forward for initial review during the AA process are presented to the Board at a noticed public meeting as an action item.

Step 4: Agency/Technical Working Groups/Public Briefings
The initial alternatives considered and the alternatives considered by the Board to be carried forward for initial review during the AA process are presented to the environmental resource agencies, Caltrans, local planning and transportation agencies, and the public for comment and feedback.

Step 5: Technical Studies
Preliminary engineering, environmental, and right-of-way studies for the alternatives for the AA process are developed.

Step 6: USEPA/Corps Staff Briefing

A summary of the alternatives to be recommended for study in the Draft EIR/EIS is presented to the USEPA and Corps as part of the 404 NEPA Integration process for their comment and feedback.

Step 7: Preparation of the Preliminary AA Report
The results of the AA process, Steps 1 through 6 above are presented in a written report which is posted on the Authority's website the morning it is being presented to the CHSRA Board.

Step 8: Board Briefing of the Preliminary AA Report
The Preliminary AA Report describing alternative alignments, station locations, and design options recommended to be studied in the Draft EIR/EIS is presented to the Board at a noticed public meeting as an action item.

Step 9: Agency/Technical Working Groups/Public Briefings
The alternatives identified by the Board for study in the Draft EIR/EIS are presented to the environmental resource agencies, Caltrans, local planning and transportation agencies, and the public for input and feedback.

Step 10: Board Briefing on Revisions to AA Report
Any recommended changes to the alternative alignments, station locations, and design options in the Preliminary AA Report based on the feedback received from the board or the Agency/Technical Working Groups/Public briefings conducted in Step 10 will be presented the Board at a noticed public meeting as an action item.

Step 11: Supplemental AA Report
Any changes to the alternatives considered/approved by the Board will be reflected in a Supplemental AA Report presenting the revisions to the Preliminary AA Report. The Supplemental AA Report will be posted to the Authority's website.

2.2 COORDINATION

Each Regional Team will coordinate their efforts with the project management team (PMT), Authority, and FRA. Coordination will also occur with other Regional Teams, as needed, for similar technical work occurring within immediately adjacent sections of the proposed HST system.

Preliminary information including the initial project alternatives as well as initial alternatives screening and evaluation shall be presented to the PMT, Authority, and FRA using diagrams, drawings, and memoranda that effectively communicate the information while minimizing preparation time and effort. The AA reports will be initially reviewed by the PMT, revised and submitted to the Authority and FRA for their review and comment. The Preliminary AA Report will contain a discussion of the coordination and consultation efforts related to alternatives analysis and opportunities for agency and public input in the process. Coordination among regional teams is required at shared project limits where the end points would connect at common stations (example: Union Station for Anaheim to LA and LA to Palmdale sections).

3.0 ASSESSMENT / ANALYSIS

3.1 ALTERNATIVES EVALUATION

The AA evaluation will be conducted using standardized evaluation measures so that each of the alternatives can be compared with each other in an effort to identify feasible and reasonable alternatives for study and alternatives that would not be studied due to environmental or engineering issues that would make approvals or implementation infeasible, that would not reduce or avoid adverse environmental impacts, that would not meet purpose and need and project objectives, or would not be feasible or practicable to construct. Starting with the alternatives selected through the program-level analyses, the Preliminary AA Report will assess preliminary alignments and station sites appropriate to the section of the HST system being studied, using the evaluation measures discussed in Section 4.0; however, each of the regional teams will have the flexibility to weight evaluation measures differently to reflect the relative importance of issues in their region. The report will include a brief discussion that characterizes key constraints or concerns in the region and explains evaluation measures used. Specific evaluation measures to be used in addition to the evaluation measures listed in Section 4.0 below must be discussed with and approved in advance by the PMT, Authority, and FRA. Applicable evaluation, discussion, and conclusions from the program EIRs/EISs should be incorporated as appropriate into the Preliminary AA Reports.

3.2 SCOPE OF ANALYSIS

Whereas the Program EIR/EIS evaluated the potential impacts various system alternatives would have at a planning level of detail, the Preliminary AA Report will assess initial project alignments, station sites and related facilities sites at a site-specific level of detail. The AA Report will document literature review, database queries, and field reconnaissance and will include a discussion of potential environmental constraints related to short-term and long-term effects. Short-term impacts will include construction, construction staging and other implementation issues. Long-term impacts will consider the direct and indirect effects and daily operations of the project. The AA Report will describe the physical effects of the location and design alternatives, consistencies with federal, and state environmental standards and future planned development, and a range of typical measures or engineering designs that could be considered to avoid, minimize, or mitigate potential impacts and an assessment of the reasonableness and feasibility of these measures. Appropriate measures and engineering designs to be considered should be identified first from the mitigation monitoring and reporting programs approved for the two Program EIR/EISs, and then should be further defined and refined to apply to the site-specific and regional issues.

4.0 EVALUATION MEASURES

4.1 CHSTP DESIGN OBJECTIVES

Project alternatives shall be evaluated using system performance criteria that address design differences and qualities. Alignment and station performance objectives and criteria are:

Objective	Criteria
Maximize ridership/revenue potential	Travel time Route length
Maximize connectivity and accessibility	Intermodal connections
Minimize operating and capital costs	Operations and maintenance issues and costs

4.2 COMPARISON OF ALTERNATIVES

In addition to the CHSTP objectives and criteria above, further measures to evaluate and compare the project alternatives are described below. Where it is possible to quantify the effects, estimates are to be provided, and where it is not possible to quantify effects, qualitative evaluation should be provided.

A. Land use supports transit use and is consistent with existing, adopted local, regional, and state plans, and is supported by existing or future growth areas as measured by:

Measurement	Method	Source
Development potential for Transit Oriented Development (TOD) within walking distance of station	Identify existing and proposed land uses within 1/2-mile of station locations. Identify if there are TOD districts, a TOD overlay zones, mixed use designations, or if local jurisdiction have identified station areas for redevelopment or economic development	Regional and local planning documents and land use analysis and input from local planning agencies
Consistency with other planning efforts and adopted plans	Qualitative - General analysis of applicable planning and policy documents	Land use analysis and input from planning agencies

B. Construction of the alternative is feasible in terms of engineering challenges and right-of-way constraints as measured by:

Measurement	Method	Source
Constructability, access for construction; within existing transportation ROW	Extent of feasible access to alignment for construction	Conceptual design plans and maps
Disruption to existing railroads	Right-of-way constraints and impacts on existing railroads	Conceptual design plans and maps

Disruption to and relocation of utilities	Number of utilities crossed.	Conceptual design plans and maps

C. Minimize disruption to neighborhoods and communities – extent to which an alternative minimizes right-of-way acquisitions, minimizes dividing an established community and minimizes conflicts with community resources as measured by:

Measurement	Method	Source
Displacements	If possible, estimate number of properties by land use type that would be displaced. Or acres of land within the right-of-way/station footprint, by type of land use: single family, multifamily, retail/commercial, industrial, etc.	Identified comparing the alignment conceptual design drawings with aerial photographs, zoning maps, and General Plan maps.
Properties with Access Affected	Estimate number of potential locations along the alignments or at station locations where, and extent to which, access would be affected.	conceptual design plans and aerial photographs
Local Traffic Effects round stations	Identify potential locations where increase in traffic congestion or LOS are expected to occur.	Existing traffic LOS from local jurisdictions
Local Traffic Effects at-grade separations	Identify potential locations at-grade separations where increases in traffic congestion or LOS are expected to occur.	Existing traffic LOS from local jurisdictions

D. Minimize impacts to environmental resources – extent to which an alternative minimizes impacts on natural resources as measured by:

Measurement	Method	Source
Waterways and wetlands and nature preserves or biologically sensitive habitat areas affected	Identify new bridge crossings required; rough estimate of acres of wetlands, width of waterways crossed; acres and species of T&E habitat affected; acres of natural areas/critical habitat affected	conceptual design plans and GIS layers; Section 404(b)1 analysis
Cultural resources	Identify locations of NRHP or CHRIS listed properties. For archaeological resources identify areas of high or moderate sensitivity based on previous studies conducted in the study area.	Based on conceptual design plans and GIS layers; Section 4(f) studies and cultural resource records search and surveys
Parklands	Estimate number and acres of parks that could be directly and indirectly affected. This would also include major trails that would be crossed;	conceptual design plans and GIS layers; Section 4(f) studies

Agricultural lands	Estimate acres of prime farmland, farmland of statewide importance, unique farmland, and farmland of local importance within preliminary limits of disturbance	conceptual design plans and GIS layers

E. Extent to which an alternative minimizes impacts on the natural environment as measured by:

Measurement	Method	Source
Noise/Vibration effects on sensitive receivers	Identify types of land use activities that would be affected by HST passby noise and ground vibration.	Results of screening level assessment: inventory of potential receivers from site survey and aerial maps
Change in visual/scenic resources	Identify number of local and scenic corridors crossed and scenic/visual resources that would be affected by HST elevated structures in scenic areas and shadows on sensitive resources (parks). Identify locations where residential development is in close proximity to elevated HST structures.	Results of general assessment; survey of alignment corridors and planning documents from local and regional agencies
Maximize avoidance of areas with geologic and soils constraints	Identify number of crossings of known seismic faults, estimate acres of encroachment into areas with highly erodible soils, acres of encroachment into areas with high landslide susceptibility.	USGS maps and available GIS data; CA Dept. of Conservation's California Geologic Survey, Regional Geologic Hazards & Mapping Program, check Map Index to identify maps appropriate for HST sections [www.conservation.ca.gov]
Maximize avoidance of areas with potential hazardous materials	Identify hazardous materials/waste areas to avoid and constraints	Data from previous records search conducted for other projects within study area.

5.0 DOCUMENTATION

5.1 LEVEL OF IMPACT

Each preliminary alternative should be evaluated individually under each objective and criterion at a preliminary level of analysis sufficient to identify potentially severe constraints and to provide an overall comparative analysis of the potential 'levels of impact' for the alternatives in a summary format. This information is expected to support determination of the feasible alternatives to be analyzed in the Draft Project EIR/EIS and the alternatives dismissed from further consideration. Starting with the Authority's adopted program-level Mitigation Monitoring and Reporting Plans, the Regional Team should identify practical mitigation measures, design considerations or avoidance techniques to address ways to minimize or avoid potentially significant impacts for consideration in the EIR/EIS. The measures should illustrate a general approach versus describing specific mitigation measures which would be addressed in the EIR/EIS. The measures should account for cause, effect, resolution and follow an "if this", "then that" format. Consideration should be given to estimated costs and likely ability to mitigate different ROW and environmental impacts.

5.2 ALTERNATIVES COMPARISON

The primary purpose of the Preliminary AA Report is to clearly describe the relative differences between preliminary alternatives based on a consistent set of evaluation measures applied to each alternative. The AA Report will summarize the attributes, potential design issues and environmental impacts and benefits for each alternative in matrix format. Alternatives identified to be dropped from further analysis should be included in the matrix and reasons for dropping the alternative should be described in the summary.

6.0 REFERENCES

6.1 INFORMATION FOR INCLUSION

All references will follow the format guidelines provided for the CHSTP. All sources must be referenced, including text, data, graphics, base maps, etc. Full referencing is also required in the text of the document in a footnote at the end of the sourced text. For tables, references will be listed as sources at the bottom of the table. For graphics, references, including base mapping, will be listed as sources in the legend.

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APPENDIX A

PRELIMINARY ALTERNATIVE ANALYSIS REPORT OUTLINE

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California High-Speed Train Project

CALIFORNIA
High-Speed Rail Authority

_____ to _____ Section Project EIR/EIS

PRELIMINARY ALTERNATIVES ANALYSIS REPORT

Prepared by: _____ _____
XXX Date

Checked by: _____ _____
XXX Date

Reviewed by: _____ _____
XXX Date

Approved by: _____ _____
XXX Date

Released by: _____ _____
XXX Date

Revision	Date	Description
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TABLE OF CONTENTS

APPENDICES

FIGURES

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TABLES

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ABBREVIATIONS / ACRONYMS

(Revise for each HST Project)

Amtrak.....National Railroad Passenger Corporation
Authority .....California High-Speed Rail Authority
BNSF.....Burlington Northern Santa Fe
Caltrans.....California Department of Transportation
CEQA .....California Environmental Quality Act
CNG .....Compressed Natural Gas
EIR .....Environmental Impact Report
EIS.....Environmental Impact Statement
FRA.....Federal Railroad Administration
GIS .....Geographic Information System
GPS.....Global Positioning System
HOV.....High Occupancy Vehicle
HST .....High-Speed Train
KOP .....Key Observation Point
LRT.....Light Rail Transit
MPH.....Miles per Hour
NEPA.....National Environmental Protection Act
PMT .....Program Management Team
ROW .....Right-of-Way
RRC .....Regional Rebuild Center
RTP.....Regional Transportation Plan
SR.....State Route
TOD.....Transit Oriented Development
USGS .....United States Geological Survey
UP .....Union Pacific

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1.0 INTRODUCTION

The California High-Speed Rail Authority (the Authority) is studying alternative alignments for a high-speed train section between _____ and _____. This study incorporates conceptual engineering information and identifies feasible and practicable alternatives to carry forward for environmental review and evaluation in the Environmental Impact Report/Environmental Impact Statement (EIR/EIS) under the California Environmental Quality Act (CEQA) and the National Environmental Protection Act (NEPA) for the _____ to ____ section of the California High-Speed Train (HST) Project.

1.1 CALIFORNIA HST PROJECT BACKGROUND

The California High-Speed Train (CAHST) is planned to provide intercity, high-speed train service on over 800 miles of tracks throughout California, that will connect the major population centers of Sacramento, the San Francisco Bay Area, the Central Valley, Los Angeles, the Inland Empire, Orange County, and San Diego. The HST system is envisioned as a state-of-the-art, electrically powered, high-speed, steel-wheel-on-steel-rail technology, which will include state-of-the-art safety, signaling, and automated train-control systems. The trains will be capable of operating at speeds of up to 220 mph over a fully grade-separated, dedicated track alignment, with an expected express trip time between Los Angeles and San Francisco of approximately 2 hours and 40 minutes.

The California HST project will be planned, designed, constructed, and operated under the direction of the California High-Speed Rail Authority (Authority), a state governing board formed in 1996. The Authority's statutory mandate is to develop a high-speed rail system that is coordinated with the state's existing transportation network, which includes intercity rail and bus lines, regional commuter rail lines, urban rail and bus transit lines, highways, and airports.

1.2 _____ TO _____ EIR/EIS BACKGROUND

1.3 STUDY AREA

1.4 PURPOSE OF STUDY

This Preliminary Alternatives Analysis (AA) Report uses initial planning, environmental, and engineering information to identify feasible and practicable alternatives to carry forward for environmental review and preliminary engineering design in the _____ to _____ HST Project EIR/EIS. This report is to assist the Authority and the FRA in identifying the range of potentially feasible alternatives to analyze in the draft Project EIR/EIS. It documents the preliminary evaluation of alternatives, indicating how each of the alternatives meets the purpose for the HST project, how evaluation measures were applied and used to determine which alternatives to carry forward for detailed environmental analysis, and which alternatives not to carry forward for further analysis.

The analysis begins with the alignment corridor selected at the conclusion of the 2005 Final Statewide Program EIR/EIS process. Public and agency comments in response to the Project EIR/EIS scoping processes and during ongoing interagency coordination meetings, and direction from the Authority and FRA were used to identify initial alternatives to carry forward for detailed environmental review. After identifying initial project alternatives, alignment plans, profiles, and cross-sections have been developed and used for this preliminary evaluation of the alternatives.

Section 2.0 describes the evaluation measures used for the AA process. Each of the project alternatives is described in detail in Section 3.0. Section 4.0 evaluates the alternatives and Section 5.0 summarizes the results of the AA analysis.

2.0 ALTERNATIVES DEVELOPMENT PROCESS

The process for this study involves the creation and refinement of alternatives, through a series of processes that are intended to compare alternatives. This study follows a defined alternative analysis process as described in the Technical Memo Alternatives Analysis Methods for Project EIR/EIS, Version 2 (October 2009), and uses both qualitative and quantitative measures that reflect a mixture of applicable policy and technical considerations.

The techniques that are used to gather information, develop and compare alternatives are described below:

Field Inspections of Corridors - The potential alignment, right-of-way, and station location are the subject of field inspection by experienced planning personnel, engineers, and analysts with experience in railroad operations, to identify conditions and factors not visible in aerial photos or on maps. Over the course of the study, field inspections become progressively more detailed as the alternatives are refined by the planning and engineering work.

Project Team Input and Review - The project team conducts team meetings to discuss alternatives and local issues that potentially impact alignments.

Qualitative Assessment - A number of the qualitative measures used to describe the alternative alignments are developed by professionals with experience in the construction and operation of high-speed rail and other transportation systems. These measures include constructability, accessibility, operability, maintainability, right of way, public infrastructure impacts, railway infrastructure impacts, and environmental impacts.

Engineering Assessment - Engineering assessments are provided for a number of measures that can be readily quantified at this stage of project development. The engineering assessments can provide information on project length, travel time, and configuration of key features of the alignment such as the presence of existing infrastructure.

GIS Analysis - The bulk of the assessment is performed using GIS data, which enables depictions of the project's interactions with a variety of measurable geographic features, both natural and built. GIS data is used to assess impacts on farmland, water resources, floodplains, wetlands, threatened and endangered species, cultural resources, current urban development, infrastructure, and oil and gas exploration and production.

2.1 HST PROJECT PURPOSE

The purpose of California High Speed Train (HST) Project is to implement the statewide HST System in sections along the corridors selected in program-level (Tier 1) decisions that will: (1) link Southern California cities, the Central Valley, Sacramento, and Bay Area; (2) provide a new transportation option that increases mobility throughout California; (3) provide reliable HST service that delivers predictable and consistent travel times using electric powered steel wheel trains, and (4) provide a transportation system that is commercially viable.

Specific project objectives of the HST system within the _____ to _____ section include:

- Improve mobility by relieving the mounting capacity and congestion constraints on the local interstate freeways (name freeways) and on State Routes (name state routes) through providing a choice of a high speed train transportation mode.

- Improve mobility by relieving the increasing capacity and congestion constraints at the XXX Airport through providing a choice of a high speed train transportation mode.
- Reduce the capacity constraints and congestion on freight and passenger rail infrastructure along the (name existing rail corridor) corridor by providing a choice of a high speed train transportation mode.
- Maximize connectivity and accessibility for passenger rail and transit at XXX Station.
- Provide a sustainable reduction in travel time between _____ and _____.
- Provide a HST alignment that is feasible in terms of engineering challenges and right-of-way constraints.
- Minimize disruptions to neighborhoods and communities along the corridor by minimizing right-of-way acquisitions, project design effects, and/or the potential for affecting community resources.
- Preserve environmental quality and protect sensitive environmental resources by reducing emissions and vehicle miles traveled for intercity trips within the XXX and XXXX Counties area, and by maximizing avoidance and minimizing impacts to sensitive environmental and natural resources adjacent to the project corridor.
- Maximize the ridership/revenue potential for the XXX Counties region by providing reliable HST operation.
- Minimize capital and operating costs related to construction, operations and maintenance of the _____ to _____ section of the statewide HST system.

2.2 Identification of Alternatives to be Carried Forward

The aim of this document is to document the evaluation process and to identify alternatives that should be carried forward through the environmental process and engineering design. Significant issues that would qualify an alternative to be carried forward from further consideration include:

- Alternative meets purpose and need and project objectives in providing a sustainable reduction in travel time between major urban centers.
- Alternative has no environmental or engineering issues that would make approvals infeasible.
- Alternative is feasible or practical to construct.
- Alternative reduces or avoids adverse environmental impacts.

2.3 HST Design Objectives

To determine each alternative's ability to meet the HST Project's primary intent, the project alternatives are evaluated using system performance criteria that address design differences and qualities in the alignment and the station locations in terms of performance. These objectives and criteria are summarized in

Table 2-1: Alignment and Station Performance Objectives and Criteria

Objective	Criteria
Max. Ridership/ Revenue potential	Travel Time
	Route Length
Maximize connectivity and accessibility	Intermodal connections
Minimize operating and capital costs	Operating and maintenance costs
	Capital cost

2.4 Comparison of Project Alternatives

In addition to the HST Project objectives and criteria presented above, additional measures are used to evaluate and compare the project alternatives. Each of these five additional measures is discussed in more detail below.

A. Land use supports transit use and is consistent with existing, adopted local, regional and state plans, and is supported by existing or future growth areas.

Table 2-2: Land Use Evaluation Measures

Land Use		
Measurement	**Method**	**Source**
Development potential for Transit Oriented Development (TOD) within walking distance of station	Identify existing and proposed land uses within 1/2-mile of station locations. Identify if there are TOD districts, a TOD overlay zones, mixed use designations, or if local jurisdiction have identified station areas for redevelopment or economic development	Regional and local planning documents and land use analysis and input from local planning agencies.
Consistency with other planning efforts and adopted plans	Qualitative - general analysis of applicable planning and policy documents	Land Use Analysis. Baseline Conditions Study

B. Construction of the alternative is feasible in terms of constructability and right-of-way (ROW) constraints.

Table 2-3: Constructability Evaluation Measures

Constructability and Right of Way		
Measurement	**Method**	**Source**
Constructability, access for construction, within existing transportation ROW	Extent of feasible access to alignment for construction	Conceptual design plans and maps
Disruption to existing railroads	Right-of-way constraints and impacts on existing railroads	Conceptual design plans and maps
Disruption to and relocation of utilities	Number of utilities diversions	Conceptual design plans and maps

C. Minimizes disruption to neighborhoods and communities – extent to which an alternative minimizes right of way acquisitions, minimizes dividing an established community and minimizes conflicts with community resources.

Table 2-4: Community Evaluation Measures

Minimized Disruption to Neighborhoods and Communities		
Measurement	**Method**	**Source**
Displacements	If possible, number of properties by land use type that would be displaced. Or acres of land within the right-of-way/station footprint, by type of land use: single family, multifamily, retail/commercial, industrial, etc.	Identified comparing the alignment conceptual design drawings with aerial photographs, zoning maps, and General Plan maps.
Property with Access Affected	Identify potential locations along the alignments or at station locations where access would be affected.	Estimated off conceptual design plans and aerial photographs
Local Traffic Effects around Stations	Identify potential locations where increases in traffic congestion or LOS are expected to occur.	Existing traffic LOS from local jurisdictions
Local Traffic Effects at-grade separations	Identify potential locations at-grade separations where increase in traffic congestion or LOS are expected to occur.	Existing traffic LOS from local jurisdictions

D. Minimize impacts to environmental resources - extent to which an alternative minimizes impacts on natural resources.

Table 2-5: Environmental Resources Evaluation Measures

Minimized Impact on Environmental Resources		
Measurement	**Method**	**Source**
Waterways and wetlands and natural preserves or biologically sensitive habitat areas affected	Identify new bridge crossings required; rough estimate of acres of wetlands, linear feet of waterways; acres and species of T&E habitat affected; acres of natural areas/critical habitat affected	Measured off conceptual design plans and GIS layers.
Cultural Resources	Identify locations of NRHP or CHRIS listed properties. For archaeological resources identify areas of high or moderate sensitivity based on previous studies conducted in the study area.	Based on conceptual design plans and GIS layers; Section 4(f) studies and cultural resource records search and surveys.
Parklands	Number and acres of parks that could be directly and indirectly affected. This would also include major trails that would be crossed;	Based on conceptual design plans and GIS layers; Section 4(f) studies
Agricultural Lands	Acres of prime farmland, farmland of statewide importance, unique farmland, and farmland of local importance within preliminary limits of disturbance.	Based on conceptual design plans and GIS layers.

E. Enhances environmental quality — extent to which an alternative minimizes impacts on the natural environment.

Table 2-6: Natural Environment Evaluation Measures

Minimize Impact on Natural Environment		
Measurement	**Method**	**Source**
Noise and Vibration effects on sensitive receivers	Identify types of land use activities that would be affected by HST passby noise and ground vibration.	Results of FRA screening level assessment. Inventory of potential receivers from site survey and aerial maps.
Change in visual/scenic resources	Identify number of local and scenic corridors crossed and scenic/visual resources that would be affected by HST elevated structures in scenic areas and shadows on sensitive resources (parks). Identify locations where residential development is in close proximity to elevated HST structures.	Result of general assessment. Survey of alignment corridors and planning documents.
Maximize avoidance of areas with geological and soils constraints	Identify number of crossings of known seismic faults, acres of encroachment into areas with highly erodible soils, acres of encroachment into areas with high landslide susceptibility.	USGS maps and available GIS data
Maximize avoidance of areas with potential hazardous materials	Hazardous materials/waste constraints	Data from previous records search conducted for other projects within study area.

3.0 PROJECT ALTERNATIVES

The evaluation of alternatives is based on the key differentiators between alternatives. Impacts or features of critical importance that are common to all alternatives are summarized in the section below.

3.1 NO PROJECT ALTERNATIVE

The No Project Alternative represents the existing conditions of the _____ to _____ section as it exists today and as it would exist in the future without the HST Project based on future development projects and improvements to the intercity transportation system that are programmed and funded For construction. The alternative includes current and future projects within the study area, as listed by Caltrans, XXX (include and cite all other transportation planning agencies including the most recent version of the Regional Transportation Plan (RTP)). Major projects included in the No Project Alternative are shown in XXXX (provide a graphic showing these projects in relation to the HST Project) and described below.

3.1.1 Related Studies

(Discuss development Project that are proposed or planned and not funded)

3.2 PROGRAM ALTERNATIVES

3.2.1 Statewide Program EIR/EIS Alternatives

The statewide Program EIR/EIS for the CAHST was completed in November 2005. The Authority and FRA selected the technology for the HST vehicles and identified potential route and station location options through the program environmental analysis. For a more detailed examination of these issues, refer to the *California High-Speed Train Final Program EIR/EIS.*

The Program EIR/EIS examined three major alternatives for the statewide transportation network. They were:

No Project Alternative – The State's transportation network as it is today, along with funded projects included in regional transportation plans.

Modal Alternative – Enhancements to the State's transportation network using existing modes and technologies (mainly expanded airports and highways).

High-Speed Train Alternative – A new high-speed train system to connect California's major urban centers.

The HST Alternative was the selected system alternative in the Program EIR/EIS. The No Project Alternative was not able to provide the needed level of intercity mobility in the future, while the Modal Alternative provided reduced mobility compared to the HST Alternative. In addition, the Modal Alternative would have a higher cost than the HST Alternative, and more significant environmental impacts.

3.2.2 _____ to _____ Routing and Station Alternatives

The alignment and station options carried forward for further consideration in the Program EIS/EIR for the ____ to _____ section are:

3.2.3 Selected Program Alternatives and Station Locations

The Authority and FRA selected the XXXXXX alignments and station locations for HST service between _____ and _____ (Provide graphic).

3.3 Initial Development of Project Alternatives

(Present history of the development of the project alternatives starting with the Program Level alternatives.)

3.3.1 Initial Review of Alternatives

3.3.2 Agency Coordination and Public Outreach

(Need to provide a description of interagency meetings, technical working group meetings, and a summary of the public outreach efforts. Append this report with the Outreach Summary Reports.)

3.3.3 Alternatives/Options Carried Forward/Not Carried Forward

Alternatives/Options not to be carried forward

-

Alternatives/Options to be carried forward:

-

4.0 EVALUATION OF ALTERNATIVES

Following the evaluation outlined in Section 2, each alternative is assessed for each of the project objectives and evaluation measures. This information is then used to decide which alternatives are carried forward into preliminary engineering design and environmental review as part of the EIR/EIS.

Table 4-1: Summary of Comparison of Alternatives

Category	Measurement	Alternative 1	Alternative 2
Design Objectives	Journey time		
	Route length		
	Intermodal Connections		
	Operating Costs		
	Capital Costs		
Land Use	Potential for TOD		
	Consistency with other planning efforts		
Constructability	Constructability		
	Acceptability of existing overcrossings		
	Disruption to existing railroads		
	Disruption to and relocation of utilities		
Disruption to Communities	Displacements		
	Properties with access affected		
	Local traffic effects around stations		
	Local Traffic Effects along Route		
	Highway grade separations and closures		
Environmental Resources	Biological resources		
	Cultural resources		
	Parklands		
	Agricultural Land		
Natural Environment	Noise and Vibration		
	Visual/scenic resources		
	Geotechnical constraints		
	Hazardous Materials		

5.0 ANALYSIS SUMMARY AND CONCLUSIONS

Based on the results of this evaluation, the following alignment alternatives, design options, and station locations be carried forward for further consideration into the preliminary engineering design and environmental review process.

APPENDIX A

DESIGN DRAWINGS PREPARED FOR EACH ALTERNATIVE